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ing with the chemical phases of plant and animal physiology indicates general interest in the similarities between chlorophyll and haemoglobin. It would seem that the identity of lipochromes and carotinoids is worthy of equal attention.

The investigation of what the carotinoids of plants and lipochromes of animals have in common physiologically would seem to be a hopeful line of work. The fact that they may readily take up oxygen seems to furnish a starting point for thought and work, which will be important, whether the results prove positive or negative.

GEO. B. RIGG

UNIVERSITY OF WASHINGTON

RATE AND MODE OF SOIL DEPOSITION IN THE PALOUSE AREA OF WASHING- TON AND IDAHO

DURING the last eight years the writer has had the opportunity to observe the formation of soils on the Columbia Plateau by the wind. The soils are often a hundred feet deep or more, and are virtually great dunes of silt brought sometimes for great distances. The area where these dunes lie is locally called the "Palouse," well known for its deep and very fertile soils.

Dust storms are frequent, and, curiously, the dust deposited is generally not raised near the place of deposition. It comes from an area of widely different characteristics. This accords strictly with Riehtofen's theory of loess. The loess is formed when the wind moves particles of silt from an arid or semiarid area and deposits them in a more humid one. Once deposited upon the moister land, the silt particles are not raised again but become a permanent acquisition to the more humid area. Two factors cause the permanency of the deposit, first the moisture in the soil causes coherence in the deposited mass, and secondly the heavier vegetation forms an entangling mesh. Shaler noted the same conditions prevailing in the formation of loess on the upper course of the Missouri River in Montana.

In the Palouse great dust clouds flying high in the air often nearly obscure the sun at a time when the soils for many miles around are

too damp to be blown. A rain or snow fall then clears the atmosphere, carrying the dust particles to earth, and they do not rise again. At the present time drifting seldom takes place but in the past it must have done so. Otherwise the dune shaped hills extending at right angles to the direction of the prevailing winds can not be explained. Thus the deep soils over the lava plains between the Columbia Valley and the Bitter Root Mountains have been formed at the expense of the drier eastern slope of the Cascade Mountains and the Columbia Valley.

To measure accurately the amount of soil brought into an area annually is well nigh impossible. Only under particular conditions is it possible to measure that brought in by a single storm. To do so it is necessary that the soils upon which the deposit takes place be not moved by the wind bringing in the dust. Once deposited, the material must not be lifted again by the same wind, and that brought to earth must be kept separate from older deposits.

A particularly favorable situation for making measurement was presented over the eastern part of the Palouse on January 29, 1917, and at that time a series of collections was begun at Moscow, Idaho, by the writer. From that date to March 23 four dust falls took place, upon all of which measurements were possible. On the afternoon of January 28 a fall of pure white snow took place. The following morning it was covered with a coat of chocolate brown dust of variable thickness. At the time practically the whole area was covered with snow. The dust therefore must have been carried nearly a hundred miles and probably was carried twice that distance.

Measurement of the amount of material deposited was made by collecting the dust covered snow from five different areas of average contour, each of four square feet in area. The snow was melted, the water evaporated and the dust weighed. From the result the deposit upon an acre was calculated as 140 pounds. Similar dust falls occurring on March 21, 22, 23 brought, respectively, 196 pounds, 184 pounds and 585 pounds per acre as measured in the same way. The total for the four dust falls is 1,105 pounds in 55 days or approximately

7,500 pounds per acre per year. This deduction of course assumes that the dust falls occur with equal frequency throughout the year. Recognizing that such an assumption is not warranted, we have made careful observation for the last three years to estimate whether the calculated amount might be below or above the actual. And though accurate measurements have been impossible we are convinced that at least the amount given is deposited in this way each year. The annual accumulation, however, does not differ widely from this figure. Many times repeated determinations of the weight of an acre foot of this soil show it to be very close to 2,450,000 pounds per acre. At the rate of accumulation just given it would require 326 years for the deposition of one foot, or approximately four inches is deposited in one century. This is four times as much as estimated by Free. If no erosion took place during deposition, according to this estimate, 25,000 years were necessary for the deposition of the seventy-five feet of soil that covers the lava beds on this plateau.

Considerable further work has been done by the writer along this line but does not bear directly upon the mode and rate of formation of this soil. The work is now to be discontinued unless some one else will take it up. A fine problem is presented in historical geology or physiography, and it is hoped that some person remaining in the vicinity of these interesting deposits will find time to take up a study of them. A measurement of the depth of the soil and more accurate measurements of the rate of deposition are problems that will lead to extremely interesting deductions regarding the age of the various lava outflows.

P. P. PETERSON

IDAHO FALLS, IDAHO

**THE AMERICAN ASSOCIATION FOR
THE ADVANCEMENT OF SCIENCE
REPORT OF THE TREASURER FOR 1921**

IN conformity with Article 15 of the Constitution and by direction of the Council, the treasurer has the honor to submit the following report for the period December 23, 1920, to December 19, 1921, both inclusive.

The total of cash receipts during the year is \$7,064.65. Disbursements made in accordance with directions of the Council amounted to \$7,959.93. These include \$2,172.36 for purchase of \$2,500 of the United States Second Liberty Loan bonds for the association and held as an investment.

The total amount of funds of the association consisting of cash, cost value of securities purchased, and appraised value of securities received from the Colburn estate is \$121,414.77.

A detailed statement is appended.

ROBERT S. WOODWARD,
Treasurer.

WASHINGTON, D. C.,

DECEMBER 19, 1921

BALANCE SHEET—DECEMBER 19, 1921

ASSETS

<i>Investments:</i>	
Securities (Exhibit "A").....	\$121,414.77
Cash in banks.....	5,585.90
	<hr/>
	\$127,000.67

LIABILITIES

<i>Funds:</i>	
Life and Sustaining Membership:	
438 at \$ 50	\$21,900
16 at \$100	1,600
6 Sustaining	6,000
	<hr/>
	\$ 29,500.00
Jane M. Smith Fund.....	5,000.00
W. Hudson Stephens Fund.....	4,381.21
Colburn Fund.....	77,755.74
Accumulated Investments.....	4,777.82
Unappropriated Interest.....	5,585.90
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	\$127,000.67

CASH STATEMENT

RECEIPTS

1920	
Dec. 23—Balance from last report.....	\$ 6,481.18
Interest from securities.....	\$5,834.24
Interest from bank balance....	30.41
Revertment of grant made to	
Theo. Hough	100.00
11 life commutations, 1921....	1,100.00
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	7,064.65
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	\$ 13,545.83

DISBURSEMENTS

<i>Investments:</i>	
\$2,500 U. S. Second Liberty Loan:	
Purchase price.....	\$2,170.80
Interest purchased.....	38.07
Commission	1.56
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	\$ 2,210.43
<i>Grants:</i>	
Gerald L. Wendt.....	\$ 200.00
Graham Edgar.....	200.00
Sebastian Albrecht.....	200.00
Caroline E. Furness.....	200.00
Frank B. Taylor.....	300.00